

APPENDIX A
EVALUATION OF SSFATE MODELING FOR NEWARK BAY

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The results of the study “SSFATE Modeling of Arthur Kill Dredging, Final Report”, by New York/New Jersey Harbor Partnership (NYNJ Harbor Partnership 2003) do not provide reliable estimates of the extent of dispersal and subsequent deposition of suspended material due to dredging. This is because the model does not appear to function properly.

Model results show local accumulations of solids in the water column at locations at some distance from the dredge. For example, in Figure 7-2 of NYNJ Harbor Partnership (2003), segments colored yellow and orange are present in Upper New York Bay just south of Kill van Kull on the western side of the channel (90 kg/m³ release rate). Such high concentrations are not observed at any depth in nearby areas of the bay or towards the eastern end of Kill van Kull. This means that this local high concentration does not appear to represent a plume of high-concentration water emanating from the dredge. Instead, solids appear to have increased in concentration in this local area. Such a local increase in TSS could occur only due to locally elevated settling rates. However, the elevated TSS levels occur in the 2 to 4m depth, that is, not near the bottom. This result suggests the possibility that the model is not conserving water mass, and thus that model results are an artifact of the how the model was developed.

This apparently counter-intuitive result may be related to the way in which the three-dimensional hydrodynamic model was coupled to SSFATE. Surface flows from the hydrodynamic model (USACE 1999) were apparently used in SSFATE for all depths within the water column. In an estuary with complex three-dimensional circulation and complex bathymetry, this method of model coupling would be likely to cause water mass not to be conserved.

ERDC plans to revisit the application of SSFATE to the Newark Bay area. The planned effort will rely upon (1) a revised version of the model SSFATE; (2) the incorporation of additional resuspension data; and (3) corrected application of hydrodynamic model results.

References

- NYNJ Harbor Partnership, 2003. *SSFATE Modeling of Arthur Kill Dredging*. Final Report, June 2003.
- U.S. Army Corps of Engineers, 1999. *New York/New Jersey Harbor Navigation Study Hydrodynamic and Water Quality Modeling*: Preliminary Draft Final Report.